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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,505	07/17/2003	Toshiaki Yoshihara	1100.68143	1976

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EXAMINER	
DUONG, THOI V	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,505	YOSHIHARA ET AL.	
	Examiner	Art Unit	
	Thoi V. Duong	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,14,15 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,14,15 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the Amendment filed November 09, 2006.

Accordingly, claim 1 was amended, and claims 8-13 and 16 were cancelled. Currently, claims 1-7, 14, 15 and 17 are pending in this application.

Response to Arguments

2. Applicant's arguments with respect to the rejection(s) of claim(s) 1-7, 14, 15 and 17 under Bradshaw's disclosure regarding the temperature width have been fully considered and are persuasive. Therefore, the final rejection has been withdrawn; however, upon further consideration, a new ground(s) of rejection is made in view of Taniguchi.

It is noted that Taniguchi's disclosure was used in the office action dated April 20, 2005; however, Taniguchi's disclosure is employed again because the claimed invention is still obvious over this cited prior art.

Claim Objections

3. Claim 14 is objected to because of the following informalities: in line 23, the claim should be read "either one of the cholesteric phase and the chiral nematic phase during cooling." Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-275685 (JP'685) in view of Taniguchi et al. (Taniguchi, USPN 5,746,939).

Re claim 1, as shown in Fig. 1, JP'685 discloses a liquid crystal display device 70 (as well as a manufacturing method of the same) comprising two substrates 81a and 81b sandwiching a liquid crystal 85 having spontaneous polarization (paragraphs 106 and 129), and electrodes 82a and 82b for applying a voltage to said liquid crystal (paragraph 31),

wherein said liquid crystal shows a monostable state in which an average molecular axis of a director of liquid crystal molecules is aligned in a single direction and present in a first position when no voltage is applied, shows a state in which the average molecular axis is tilted in one direction from the first position at an angle corresponding to a magnitude of a voltage of a first polarity and present in a second position (first brightness) when the voltage of the first polarity is applied, and shows either a state in which the average molecular axis maintains the first position or a state in which the average molecular axis is tilted in a direction opposite to said one direction from the first position and present in a third position (second brightness) when a voltage of a second polarity opposite to the voltage of the first polarity is applied (see Abstract),

wherein, said liquid crystal is introduced between said two substrates (paragraph 102);

wherein a phase sequence of said liquid crystal is isotropic phase – cholesteric phase – chiral smectic C phase from a higher-temperature side (paragraph 94); and

wherein, an alignment treatment (application of an electric field to the liquid crystal during a cooling process) is performed to bring said liquid crystal into the monostable state by cooling and by providing a period in which the temperature of said liquid crystal is kept within a temperature range showing the cholesteric phase during cooling, after heating said liquid crystal to a temperature of the isotropic phase thereof (paragraphs 11, 39, 102, 106 and 137).

However, JP'685 does not disclose a temperature range of the cholesteric phase of the phase sequence of said liquid crystal having a temperature width of not less than 3°C.

As shown in Fig. 3, Taniguchi discloses that a temperature range of a cholesteric phase is from about 58 degrees C to about 92 degrees C. Accordingly, this range has a temperature width of 34 degrees C, which meet the claimed temperature width of not less than 3 degrees C (col. 3, lines 1-48),

wherein, re claim 2, the temperature range of the cholesteric phase of the phase sequence of said liquid crystal has a temperature width of not less than 5 degrees C; and

wherein, re claim 4, the temperature range of the cholesteric phase of the phase sequence of said liquid crystal has a temperature width of not less than 10 degrees C.

Re claims 3, 5 and 6, Taniguchi discloses that said liquid crystal is a ferroelectric liquid crystal (col. 2, lines 60-63).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal display device of JP'685 with

the teaching of Taniguchi by employing a liquid crystal comprising a temperature range of the cholesteric phase having a temperature width of not less than 3°C in order to improve display and driving characteristics (col. 2, lines 27-32).

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-275685 (JP'685) in view of Taniguchi et al. (Taniguchi, USPN 5,746,939) as applied to claims 1-6 above and further in view of Yoshinaga et al. (Yoshinaga, USPN 6,791,527 B2).

As shown in Figs. 1 and 5, the liquid crystal display device of JP"685 comprises a data-writing scanning voltage (or voltage of first polarity) and a data-erasure scanning voltage (or voltage of second polarity) applied to the electrodes 82a and 82b (Abstract and paragraphs 58-71).

The liquid crystal display device of JP'685 as modified in view of Taniguchi above includes all that is recited in claim 7 except for a back-light driven by a field-sequential color scheme.

Yoshinaga discloses a liquid crystal display device comprising a back-light driven by a field-sequential color scheme (col. 5, lines 35-49).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal display device of JP'685 with the teaching of Yoshinaga by employing a back-light driven by a field-sequential color scheme to effect color display based on a timewise additive process and improve quality of motion images while suppression power consumption (col. 4, lines 43-45 and col. 5, lines 48-49).

7. Claims 14, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-275685 (JP'685) in view of Taniguchi et al. (Taniguchi, USPN 5,746,939) and Asao et al. (Asao, US 2002/0018171 A1).

Re claim 14, as shown in Fig. 1, JP'685 discloses a manufacturing method of a liquid crystal display device 70 comprising two substrates 81a and 81b sandwiching a liquid crystal 85 having spontaneous polarization (paragraphs 106 and 129), and electrodes 82a and 82b for applying a voltage to said liquid crystal (paragraph 31),

wherein said liquid crystal shows a monostable state in which an average molecular axis of a director of liquid crystal molecules is aligned in a single direction and present in a first position when no voltage is applied, shows a state in which the average molecular axis is tilted in one direction from the first position at an angle corresponding to a magnitude of a voltage of a first polarity and present in a second position (first brightness) when the voltage of the first polarity is applied, and shows either a state in which the average molecular axis maintains the first position or a state in which the average molecular axis is tilted in a direction opposite to said one direction from the first position and present in a third position (second brightness) when a voltage of a second polarity opposite to the voltage of the first polarity is applied (see Abstract),

wherein a phase sequence of said liquid crystal is isotropic phase – cholesteric phase – chiral smectic C phase from a higher-temperature side (paragraph 94);

introducing said liquid crystal between said two substrates (paragraph 102); and

performing an alignment treatment (application of an electric field to the liquid crystal during a cooling process) to bring said liquid crystal into the monostable state by

cooling said liquid crystal and by providing a period in which the temperature of said liquid crystal is kept within a temperature range showing the cholesteric phase during cooling, after heating said liquid crystal to a temperature of the isotropic phase thereof (paragraphs 11, 39, 102, 106 and 137).

However, JP'685 does not disclose a temperature range of the cholesteric phase of the phase sequence of said liquid crystal having a temperature width of not less than 3°C and a cooling rate of 3 to 10°C /minute as recited in claim 14.

At first, as shown in Fig. 3, Taniguchi discloses that a temperature range of a cholesteric phase is within about 58°C and about 92°C. Accordingly, this range has a temperature width of 34 °C, which meet the claimed rande of not less than 3°C (col. 3, lines 1-48).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal display device of JP'685 with the teaching of Taniguchi by employing a liquid crystal comprising a temperature range of the cholesteric phase having a temperature width of not less than 3°C in order to improve display and driving characteristics (col. 2, lines 27-32).

Further, Asao discloses a liquid crystal having a temperature range of a cholesteric phase of a phase sequence "isotropic phase 86.3 degrees - Cholesteric phase 61.2 degrees - chiral smectic C phase –7.2 degrees" of a liquid crystal (paragraph 98). Asao also suggests an alignment treatment performed by cooling said liquid crystal at a rate of 5°C /minute and by providing a period in which the temperature of said liquid crystal is kept within a temperature range (61.2 degrees) showing the

cholesteric phase during cooling, after heating said liquid crystal to a temperature of the isotropic phase thereof (paragraph 106). Accordingly, the cooling rate of 5°C/minute is within the claimed range of 3 to 10°C /minute.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal display device of JP'685 with the teaching of Asao by cooling the liquid crystal at a rate of 5°C/minute in order to obtain a monostabilized state under no voltage application (paragraph 44) and provide an improved contrast for the display (paragraph 12).

Re claim 15, JP'685 discloses that the alignment treatment is performed after heating said liquid crystal to an isotropic phase (paragraph 137). Asao also suggests the same performance (paragraphs 98 and 106).

Re claim 17, as shown in Fig. 3 of Taniguchi, the temperature range within 92°C and 58°C is the period when the liquid crystal is kept in the cholesteric phase during cooling, the cooling of said liquid crystal is gradually at a rate of 0.5°C/hour to cause a successive phase transition (col. 4, lines 16-22). Accordingly, this rate meets the claimed range of 0.5°C/minute or less.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached at (571) 272-1787.

Thoi V. Duong

11/29/2006